



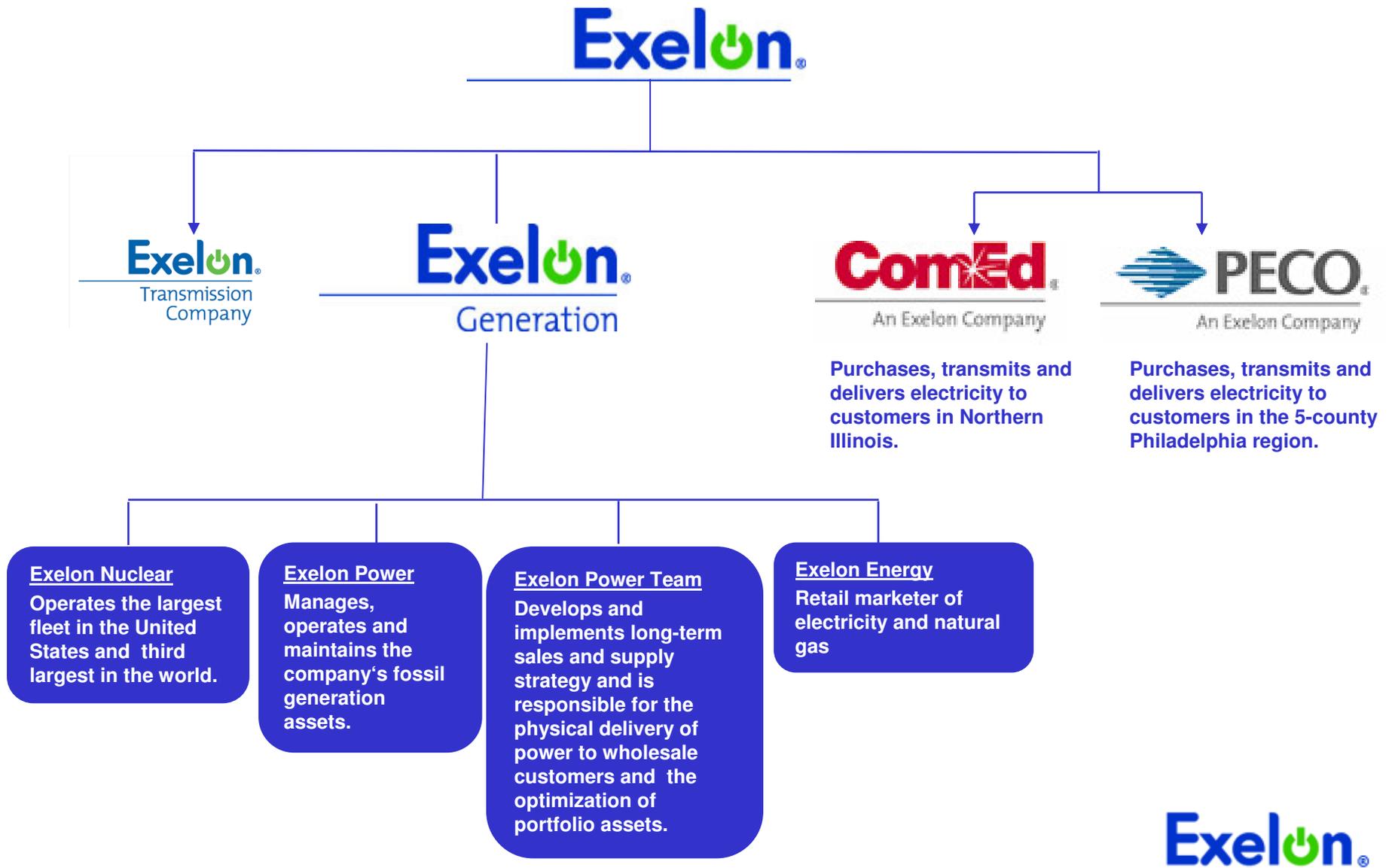
A Power Producer's Perspective on Dodd-Frank (Hedging Physical Power)

September 2, 2010



- **Company overview**
- **Power markets, energy prices and cash flow/earnings risk**
- **Hedging**

The Exelon Companies



Multi-Regional, Asset-Based Company

Exelon
Generation

ComEd
An Exelon Company

PECO
An Exelon Company

Electricity Customers: 3.8M

Electricity Customers: 1.6M
Gas Customers: 0.5M

<u>Total Capacity</u>	
Owned:	24,850 MW
Contracted:	6,153 MW
Total:	31,003 MW

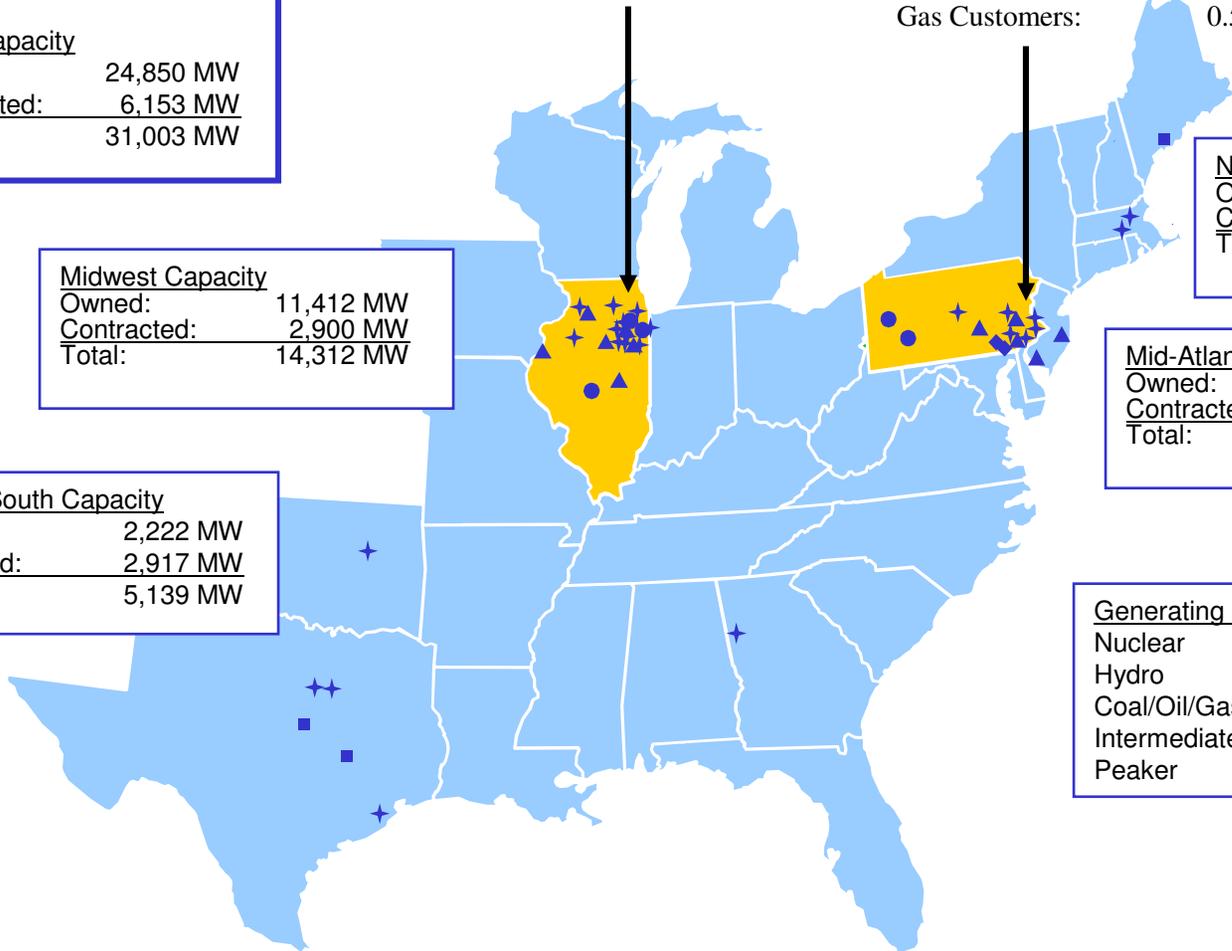
<u>Midwest Capacity</u>	
Owned:	11,412 MW
Contracted:	2,900 MW
Total:	14,312 MW

<u>ERCOT/South Capacity</u>	
Owned:	2,222 MW
Contracted:	2,917 MW
Total:	5,139 MW

<u>New England Capacity</u>	
Owned:	182 MW
Contracted:	0 MW
Total:	182 MW

<u>Mid-Atlantic Capacity</u>	
Owned:	11,034 MW
Contracted:	336 MW
Total:	11,370 MW

<u>Generating Plants</u>	
Nuclear	▲
Hydro	◆
Coal/Oil/Gas Base-load	●
Intermediate	■
Peaker	✦



Exelon

- **Is ...**
 - Owning and operating a fleet of generating units and selling the electricity to wholesale customers in spot and forward markets (Exelon Generation)
 - Owning and maintaining electric transmission facilities that deliver bulk power to local distribution systems (ComEd and PECO)
 - Owning and operating electric distribution systems that deliver electricity to over five million retail customers (ComEd and PECO)
 - Hedging the price risk associated with its generation portfolio (Exelon Generation – Power Team)
- **And is not ...**
 - Engaging in financial or derivatives trading or dealing

Organized Power Markets - Price Volatility

- These physical markets yield the volatile spot prices that Exelon hedges using different types of transactions
 - Examples are PJM, MISO, ISO-NE, and ERCOT
- Primary mission is to match supply (generation) and demand (load) based on market offers for supply
 - Determine spot market prices at generator nodes (pay generators) and load buses (charge loads a zonal price based on aggregation of load bus prices)
 - Create and publish prices for combinations of nodes called “hubs” to facilitate power markets
- Spot market prices are a function of the spot fuel price for the type of fuel used by the marginal generating unit needed to match demand
 - Fuel on the margin is usually coal or natural gas
 - Demand is largely a function of the weather

Forward Power Prices and Cash Flow Volatility

Forward Power Prices

2012 Power Price on
On Jan 1 2009

\$ 60 / Megawatt-hour
(MWh)

2012 Power Price on
On Jan 1 2012

\$ 80 / MWh

\$ 60 / MWh

\$ 40 / MWh

Forward Power Price



Revenue Implications

Increase in expected revenues

- Cash surplus
- Meet operating expenses and interest payments
- Pay dividends and invest in new infrastructure.

No change in expected revenues

- Cash to meet operational expenses, interest payments, dividends etc.

Decline in expected revenues

- Cash shortfall
- Cannot fully meet operating expenses, interest payments
- Unable to pay dividends and invest in new infrastructure.
- Increased credit risk and associated margin requirements

Forward prices can fluctuate substantially

If left unhedged, cash flows are subject to substantial fluctuations due to changes in power prices

- Exelon hedges price volatility that exists in the markets in which most of Exelon's generating units are located
- Objectives
 - Maintain desired credit rating
 - Ensure cash flow certainty to enable capital expenditures and cover O&M
 - Maintain shareholder value return policy
- Longer term hedging – portfolio management (mitigate forward power market price risk)
 - Transactions that typically start six months to three years after the trade date and have terms of a year or longer
- Shorter term hedging – portfolio optimization (adjust hedging due to changes in unit availability and the weather)
 - Transactions that start from as soon as the next hour and have terms ranging from the next hour up to six months

Types of Hedging Transactions

- Physical transactions
 - Standard megawatt blocks of energy
 - Products to match load (electricity demand) of customer
 - Sales to distribution utilities like PECO, ComEd, PPL, Allegheny, under state auctions/RFPs, to serve customers not receiving service from competitive retail suppliers
- Financial transactions
 - Standard over-the-counter (OTC) swaps: agreements to exchange floating price stream (e.g., PJM spot market price x MW amount) for fixed price stream (agreed fixed price x same MW amount)
 - Exchanged-traded swaps
 - Standard put options: seller provides to buyer the right, but not the obligation, to sell at a fixed price (meaning in effect the right to exchange a floating price stream for a fixed price stream)
 - Fixed strike price is part of agreement, premium paid for the option
 - Proxy hedges of forward power prices using commodities the prices for which are closely correlated with forward power prices (e.g., buy natural gas puts)

- Exelon produces power, and seeks to hedge in markets where liquidity exists
- Market for physical hedges in out years can be relatively thin
- Market for financially-settled hedges in out years is typically more liquid
- A substantial percentage of Exelon's longer term hedges are OTC swaps

Example - OTC Swap To Hedge Long-Term Price Risk

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- Assume 100 MW of expected generation in PJM in Calendar Year 2013
- Assume further that a market exists for OTC swaps for 2013 and that the price today to buy a swap for the entire year is \$60/MWh
- Revenue possibilities without hedge, and assuming an average spot price in 2013 could be \$40, \$60, or \$80 per MWh:

$$\text{Revenues} = 100 \times \text{PJM Western HUB Price (\$/MWh)} \times 8760$$

↑
Expected
Generation
(MW)

↑
Variable
Market Price

↑
Hours per
year

PJM WHUB Price (\$/MWh)	40	60	80
Revenues	\$35M	\$52.5M	\$70M

OTC Swap Example (cont'd)

Revenues assuming entry into OTC swap for \$60/MWh:

Revenues (fixed for float swap) = $100 \times \$60 \times 8760 - 100 \times \text{PJM WHUB Price} \times 8760$

Revenues (net : generation and swap) : $100 \times \$60 \times 8760 = \52.5 M



Seller still paid by PJM for generating, but effectively transfers that revenue to swap counterparty in exchange for fixed price revenue stream

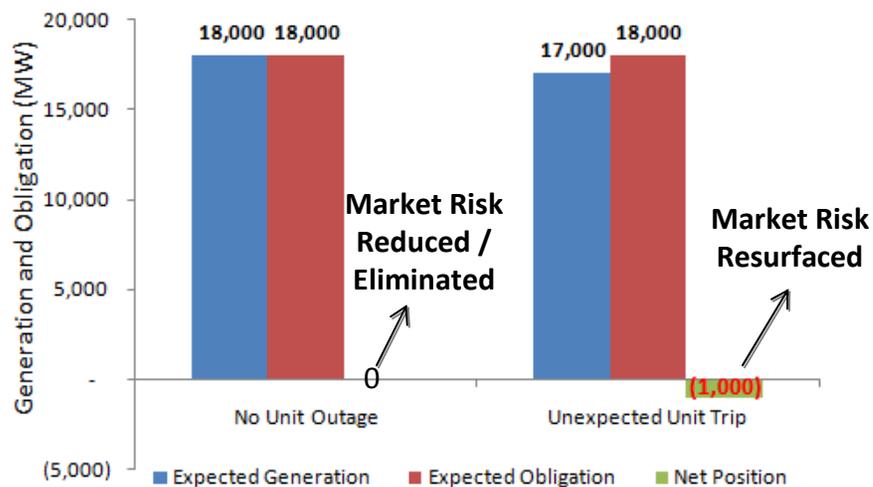
PJM WHUB Price (\$/MWh)	40	60	80
Revenues	\$52.5M	\$52.5M	\$52.5M

Unit Failure Example – Shorter Term Hedging

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- Unexpected loss of supply (generation unit failures) :
 - An outage or partial outage of a unit, such as an unexpected boiler leak at a coal plant can cause the unit to be out of service for days, weeks or even months
- Implications :
 - As most of the generation has been sold forward/hedged via swaps, a unit failure causes the power producer to be short power (oversold) because the generation is no longer available (some forward sales become unnecessary as hedges, and themselves create market risk, because power producer is no longer being paid the floating price stream it is transferring to its swap counterparty)
- Required hedging action :
 - Enter into an opposite fixed-for-floating swap (pay a fixed price in return for the floating price) or buy physical power at a fixed price to bring position back into balance

Net Position : Generation and Obligation

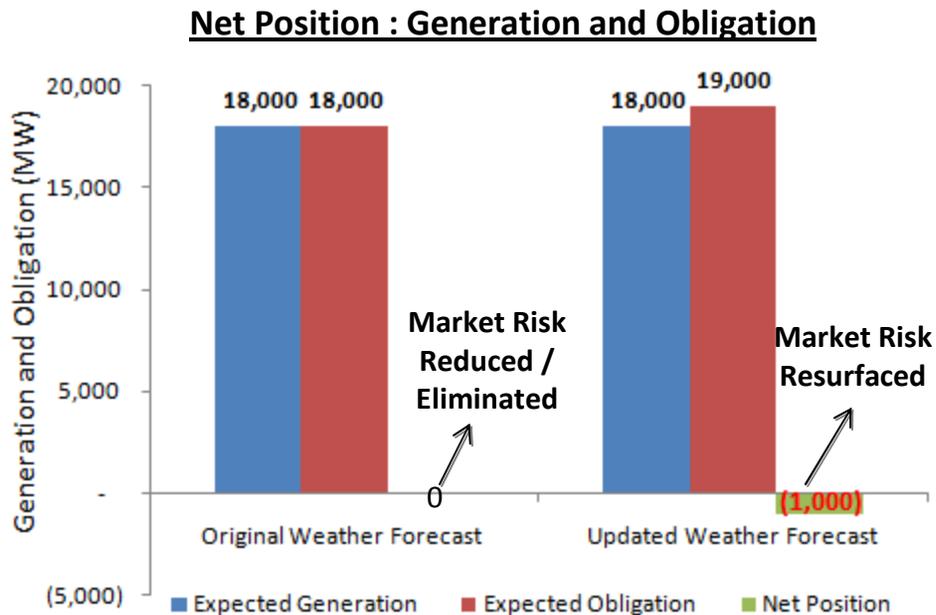


Example reflects loss of 1,000 MW in expected generation due to an unexpected unit outage. The way to hedge as a result of this would be to enter a fixed for float swap, effectively buying back the lost 1,000 MW in the market for a known, fixed price

Weather Risk Example – Very Short Term Hedging

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- Weather Risk (impact on quantity of sales obligation):
 - Weather is one of the primary factors influencing electricity demand - and it is hard to predict
- Implications:
 - If expected temperatures increase in the short-run (typically anywhere from the next hour up to 10-15 days out), expected need for generation increases (and vice versa).
- Required Hedging Action:
 - In the situation where a revised weather forecast and corresponding load obligation exceeds the original expected load obligation (more demand than expected), a power producer may choose to buy physical power at a fixed price, or enter into a swap where it pays the fixed price and receives the floating price, both of which would reduce price exposure from being short the power.



As a result of increased demand of a 1,000 MW caused by unexpected weather, producer would once again be exposed to market prices. A way to hedge against this would be to enter a new fixed for float swap, effectively buying the previously unanticipated 1,000 MW at a known, fixed price.

- Demand exists for the “real” product – electricity
 - Demand for power is the basis of the long-run value of generators
 - Physical generators hedge to mitigate price risk
 - Through hedging, a generator is “locking in” its sales revenues
 - When the buyer is a load-serving entity it is locking in its purchase costs
- Ownership of real assets ensures stability in either rising or falling markets
 - Locked in revenue stream creates cash flow certainty and therefore the ability to meet financial obligations
 - In rising market, a net seller’s collateral requirements increase, but so too does the value of its assets (right-way risk)
 - In falling market, a net seller’s collateral requirements decrease and its hedges protect value

Hedging by power generators, or by others with tangible assets with inherent economic value, does not contribute to systemic risk

- A physical generator is in the business of producing and selling power
- A physical generation business must hedge its risk
- Efficient hedging requires transactions in both physical and financially-settled products
- OTC swaps are key tool for hedging
- Although a swap customer, a physical power generator is not a "dealer" or otherwise in the "swap business"
- A physical generator that uses financial transactions as part of its hedging program will not thereby create systemic risk